INSIDE TRACK

INVESTORS MIND THE GAP

John Hargreaves demystifies the energy gap, explaining why it might exist and how it might be closed

Winter is approaching. Even without checking a calendar you can be sure. For not only are the shops already displaying their Christmas wares, but an annual flock of migrating media stories has arrived once more on our shores. The 'energy gap' is back again.

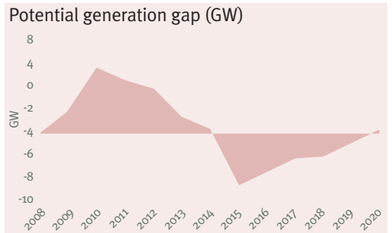
Every year the scenario of 'the lights going out' returns to bother those of us with memories of the 1970s. It weighs heavily on the minds of the politicians and civil servants in charge of UK energy policy. But what exactly is the problem?

An energy gap or, more accurately, a power generation gap, exists if generation capacity is insufficient to meet peak demand. As a consequence, customers experience blackouts or voltage reductions. To avoid this there needs to be a surplus of capacity over expected demand to allow for unexpected problems with power plant and unusual demand fluctuations, usually weather related. This excess is known as the planning margin and the UK minimum is 20 per cent. In 2007 the UK had a healthy capacity margin of 25 per cent.

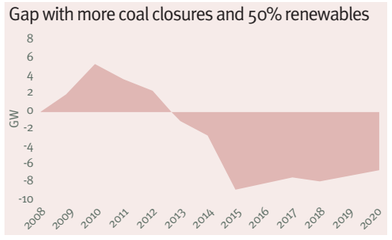
Installed capacity	81GW
Expected peak demand	65GW
Planning margin	20%
Capacity required to give 20 per cent planning margin	78GW
Actual capacity margin	**25%**

So in reality, the generation gap is not a problem that is with us right now. But what about the future? A gap could result from the scheduled closure of 17.5GW of capacity in the next seven or eight years. If other things remained unchanged this would give capacity of only 98 per cent of peak demand rather than the 120 per cent required by the planning margin.

But other things will not remain unchanged and there is time to do something about it. Some 6GW of capacity, fueled by gas, is either in construction or has a firm start date and the UK government has set a challenging target for generation from renewable sources. Even with these developments, we could face a moderate capacity shortfall from 2015 to 2019 as the following illustration shows:



The gap would be greater if there were more closures of thermal capacity than those currently notified – estimates range from zero to 13.5GW of additional closures – or if renewables capacity did not expand as hoped, or both. Such a position is illustrated in the graph below.



If energy demand grew faster than expected, the shortfall would be greater. These graphs assume that the effects of economic growth on the demand for power are offset by energy conservation.

New generating capacity takes time to construct and, in the case of renewables, to connect to the national grid. It would be foolish to ignore the potential gap and the choices we make now are crucial. So, how should we close the gap predicted for the next decade, at the same time as meeting our other objectives of dramatically reduced carbon emissions and providing affordable energy?

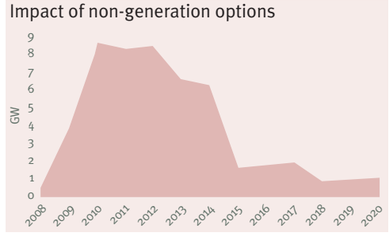
HOW TO CLOSE THE GAP?

The tendency of policy-makers is to look for more generation capacity, but this is not the only way. A policy package to deal with the shortfall at lowest cost and consistent with emissions targets should be dominated by non-generation options, including:

- demand side changes: building efficiency, low energy lighting and appliances; and better management of supply and demand, eg energy control equipment, interruptible contracts and smart meters;
- non-generation supply side changes: a better match between demand and supply such as interconnection, hydro from Norway might provide economical back up for UK wind; and system enhancements, including transmission and storage;
- other options: combined heat and power (CHP), other forms of distributed generation (micro-CHP, heat pumps, etc) and more efficient gas use for space and water heating;
- market reforms: in the EU and the UK.

These options have the advantage that, unlike low carbon generation, many are viable without support energy savings give a return on the investment. Such options are more economic when fuel prices are high and all reduce carbon emissions. Experience, however, shows that efficiency savings are hard to realise and progress is dependent on radical changes to business models and engrained social practices.

The effective adoption of non-generation options from 2008 onwards would make the generation gap picture look very different. The following graph allows for demand side changes such as the ones outlined above.



There is clearly huge potential for non-generation options to help address concerns about the feared generation gap, and they come out as an attractive option when compared with various additional generation options across a range of policy criteria.

The table on the right shows the relative attractiveness of the main ways of addressing the generation gap.

This suggests that the policy puzzle is slightly different from that which is usually posed. The challenge is multifaceted: how to push through a suite of measures that together amount to significant contribution from non-generation options? Who owns the problem, and who owns the solution? Who do you ask to create a block of non-generation capacity savings?

Policy change in this area is urgent and there are a number of priorities to be addressed. There needs to be continued commitment to the EU emissions trading scheme and market reform. Barriers and market failures that are holding back non-generation options have to be dealt with and energy sector regulation should be changed to encourage new business models and a restructuring of the sector.

In the UK, it is investors who make power market decisions. While they don't wish to conflict with their customers and public opinion, they do see a multitude of risks when they consider investing in what is conventionally seen as the only commercially available option: new generation capacity.

As well as issues arising from the credit crunch and the availability and cost of capital, these include risks of fuel price fluctuations, demand risk as the recession bites, and technology specific risks:

Coal. There is a risk that the carbon price will rise to a level where coal-fired power plants are not economic to run. More stringent emissions regulation would have a similar effect.

Gas. An obvious solution, with relatively low capital costs and faster construction times, but it is exposed to price fluctuation and geo-political risks to supply. These risks have led to concern about the UK's possible over-reliance on imported gas as domestic sources decline.

Carbon capture and storage (CCS) and nuclear. CCS technologies are still untried at commercial scale. Nuclear power, even fast-tracked from now, will not be available to fill a generation gap in the middle of the next decade.

The complexity of this decision-making environment means investors are quite likely to defer investment. It is this hesitation that creates the so-called 'energy gap'. Investors are concerned are about the adequacy of generation capacity, the resilience of the power system and dependence on imports of primary fuels. The impending recession may also reduce investor appetite and increase the capital costs.

Evaluation of options

	Security		Reducing Co2	Timing	Resource cost*	
	Diversity	Capacity			Co/tonne	C25/tonne
Unabated coal	***	*****	*	***	***	***
More gas	*	****	**	*****	***	****
Coal with CCS	****	***	***	*	**	***
More renewable	*****	*	****	**	*	*
Non generation	*****	***	*****	****	*****	*****

key: 5 star = best, 1 star = worst'
* Resource cost is long run marginal cost at a carbon price of €0 and €25/tonne
Coal (unabated and with CCS) is Advanced Super Critical (ASC)
The marginal renewable source is offshore wind

At present, investor considerations include the following:

Renewables. These are attractive under the renewables obligation but will become less so if primary fuel prices fall.

The recession. This will lead to lower supply chain inflation and capacity constraints which may be relatively favourable to capital intensive technologies.

Political risks. These make investment in unabated coal less likely, but operators still want to maintain a diverse portfolio of fuels, as seen in recent proposals for new coal-fired plant in the UK.

Additional gas plant investment. This has least risk on most counts other than exposure to fuel prices although, at current prices, coal is more attractive to run than gas.

Opted-out plant. There is an economic case for extending the life of older, dirtier power stations which have 'opted-out' from meeting more stringent pollution control limits. At present, they are scheduled to close by 2016. This might be a short term solution to a short term problem but it would be opposed by the owners of opted-in plants as well as the EU and NGOs.

> The complexity of this decision-making environment means investors are quite likely to defer investment

So, if non-generation options are difficult to achieve, and investors are uncertain about traditional power generation options, the implication is a substantial risk of a generation shortfall.

This could have long-term repercussions. The new emissions targets for 2050 announced by Ed Miliband will entail a much bigger capital investment programme than previously contemplated: primarily in renewables, distributed energy systems, and other low-carbon technologies such as carbon capture and storage and nuclear. The role of electricity in achieving emissions targets is already substantial and the need for increased generation capacity may become greater if heat and transport policies are not effective.

There is at present too much policy clutter. Policy-makers need to focus down on the key areas and show clearer commitment. Most importantly, there should be:

- policy changes to promote non-generation options, including changes to economic regulation to provide incentives for a new business model for energy companies, possibly changes in industry structure, refocusing of the planning and building regulations systems and steps to address market failures, including serious efforts to inform, educate and persuade, backed by incentives
- more determined support for CCS, both pre- and post-combustion. If CCS can be shown to be commercially viable it has the potential to play a significant role as a transition technology as we move to a zero-carbon energy system and the UK has significant advantages in deploying the technology.

Additionally, we need to increase the likelihood of the renewables target being met, with broader scope given to renewables technologies and more efficient policy design.

Intelligent policies in support of CCS and of non-generation technologies could close the energy gap. Decisions taken now will be key to our energy future. We need to give investors confidence that a low-carbon future is both achievable and profitable, both for new power plants and that elusive non-generation capacity.

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